

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

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Corres. to PCT/EP2004/010330

For: HEATING ASSEMBLY COMPRISING A PTC ELEMENT, IN PARTICULAR
FOR A MOTOR VEHICLE

TRANSLATOR'S DECLARATION

Commissioner for Patents

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Sir:

I, the below-named translator, certify that I am familiar with both the German and the English language, that I have prepared the attached English translation of International Application No. PCT/EP2004/010330, and that the English translation is a true, faithful and exact translation of the corresponding German language paper.

I further declare that all statements made in this declaration of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of legal decisions of any nature based on them.

March 30, 2006

Date _____

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For and on behalf of RWS Group Ltd

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Heating assembly with a PTC element, in particular for
a motor vehicle .

5 The invention relates to a heating assembly with a PTC
element, in particular for a motor vehicle, according
to the precharacterizing clause of claim 1.

10 DE 101 44 757 A1 discloses a heating assembly with a
PTC element for passenger vehicles, a supplementary
heating system being provided, having a heating element
through which heating air flows during operation of the
supplementary heating system and having at least one
15 air outlet opening in the foot region of a passenger
compartment, to which the heating air is conducted. To
allow a vertical temperature stratification that is
also comfortable in particular for seats at the rear to
be produced in the passenger compartment in a flexible
way, the heating element takes the form of an
20 electrical PTC element, which is arranged directly at
the air outlet opening in the foot region. A
supplementary heater of this type still leaves
something to be desired. According to one disclosed
exemplary embodiment, a PTC element in the form of a
number of heating honeycombs is arranged in a plastic
25 frame (not described in any more detail), which
surrounds the air outlet opening.

The object of the invention is to provide an improved
heating assembly with a PTC element.

30 This object is achieved by a heating assembly with a
PTC element having the features of claim 1.
Advantageous refinements are the subject of the
subclaims.

35 According to the invention, a heating assembly with at
least one PTC element is provided, which PTC element is
arranged between two contact plates which serve for

making electrical connection, at least one of the two contact plates having an offset outside the frame, and the offset part of the projecting part of the contact plate running parallel to the remaining part of the contact plate. This makes easier insertion possible.

It is preferred for the frame to be formed in an insulating manner, preferably from polyamide.

The frame has spacers, which are arranged between mutually assigned contact plates. These spacers serve for keeping the contact plates apart and preferably also for the attachment of the individual heating sections in the frame. For this purpose, two spacers are provided on mutually opposite sides of the frame for each pair of mutually assigned contact plates.

It is preferred for there to be formed between neighboring heating sections a distance which is respectively formed by a PTC element, a pair of mutually assigned contact plates and corrugated ribs.

The contact plates and the PTC element and/or the contact plates and the corrugated ribs are preferably securely bonded to one another by means of an adhesive or a solder. Such bonds can be produced easily and at low cost.

A further plate is preferably attached to the corrugated rib on the side opposite from the contact side of the contact plate and the corrugated rib. This may be a plate of an electrically insulating material, for example polyamide, or a plate of aluminum.

The invention is explained in detail below on the basis of two exemplary embodiments with reference to the drawing, in which:

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Figure 1 shows a view of a heating assembly according to the first exemplary embodiment,

5 Figure 2 shows a view of a heating assembly according to a modification of the first exemplary embodiment, and

10 Figure 3 shows a view of a heating assembly according to the second exemplary embodiment.

In the case of a PTC heating assembly 1 according to a first exemplary embodiment with a ceramic PTC element 2, the PTC element 2 is bonded in place between two contact plates 3 (positive terminal) and 4 (negative terminal) that are arranged parallel to each other, in the present case by means of an adhesive (not represented). Alternatively, a soldered bond may also be provided for example. Corrugated ribs 6 are attached by means of a corresponding adhesive bond on those sides of the contact plates 3 and 4 which in each case lie opposite the PTC element 2. Two corrugated ribs 6, two contact plates 3 and 4 and a PTC element 2 respectively form a heating section 8. The heating assembly 1 is formed by a plurality of heating sections 8, only three heating sections 8 being represented in Figure 1. Arranged around the heating assembly 1 described above is a plastic frame 7, in the present case of polyamide. The flow direction of the air is in the viewing direction in the case of Figure 1.

30 Between the contact plates 3 and 4 there is a voltage of 13 V, but the voltage may also be greater, for example 48 V. The contact plates 3 and 4 project on one side of the plastic frame 7, forming a plug 9. In this case, the projecting part 10 of the first contact plate 3 is bent twice by 90° in such a way that the projecting part 10 runs parallel to the remaining part 11, which is arranged in the plastic frame 7, whereby

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the distance between the two contact plates 3, 4 is increased outside the plastic frame 7.

To keep the two contact plates 3 and 4 spaced apart, spacers 12 are provided, formed on the plastic frame 7 as inwardly protruding webs, and penetrating between the contact plates 3 and 4 from the ends of the same on one side. On the other side, in the region of the end of the remaining part 11, the spacer 12 is arranged between the two contact plates 3 and 4. The spacers 12 also serve for fastening the individual heating sections 8 in the plastic frame 7.

The heating sections 8 may serve here as standard elements which can be fitted into different frames, thereby reducing the production costs.

According to a modification of the first exemplary embodiment that is represented in Figure 2, the distance between two neighboring heating sections 8 is made larger, so that the pressure drop of the air is reduced. The same heating sections 8 as in the case of the basic form described above can be used here.

Figure 3 shows a heating section 8 according to a second exemplary embodiment, a plate 13, which consists of an insulating material, in the present case polyamide, in each case being provided on the outer side of the heating section 8. In this case, the plates 13 may be securely attached to the corrugated rib 6 by means of adhesion (same adhesive as is used for bonding the PTC element 2 and the contact plates 3 and 4 and/or for bonding the contact plate 3 or 4 and the corrugated rib 6) or by means of a soldered bond.

List of designations

- 1 heating assembly
- 2 PTC element
- 3 contact plate
- 4 contact plate
- 6 corrugated rib
- 7 plastic frame
- 8 heating section
- 9 plug
- 10 projecting part
- 11 remaining part
- 12 spacer
- 13 plate